

REMARKS

In the Office Action, the Examiner rejected Claims 1, 3-11 and 13-19, under 35 U.S.C. 102 as being fully anticipated by U.S. Patent 6,850,946 (Rappaport). Also, the Examiner objected to Claims 2 and 12 as being dependent from rejected base claims, and the Examiner indicated that Claims 2 and 12 would be allowable if appropriately re-written.

Independent Claims 1, 11 and 17 are being amended to better define the subject matters of these claims. Claim 2 is being rewritten in independent form including all of the limitations of original Claim 1. New Claim 20, which is dependent from Claim 17, is being added to describe the feature of the disclosed embodiment of the invention that is also described in Claims 2 and 12. Further, in the specification, the Brief Description of the Drawings is being amended to refer more expressly to individual Figures.

It is believed that Claim 2 is now in condition for allowance without further argument or discussion, and the Examiner is asked to reconsider and to withdraw the objection to Claim 2 and to allow this claim.

Also, for the reasons discussed below, Claims 1 and 3-20 patentably distinguish over the prior art and are allowable. The Examiner is thus asked to reconsider and to withdraw the rejection of Claims 1, 3-11 and 13-19 under 35 U.S.C. 102, and the objection to Claim 12, and to allow Claims 1 and 3-20.

The present invention relates to editing three dimensional models by editing two dimensional images. As discussed in the instant application, the size and complexity of three dimensional digital models is increasing in many applications, and fine detailed editing of

objects is needed for the design of products requiring aesthetic appeal that are to be produced by programmed machines.

3D object editing is difficult, however, for a number of reasons. One reason why this is difficult is because it is now common for models to be comprised of hundreds of megabytes or more of data. While numerous simplification methods have been developed, many objects overwhelm rendering systems when displayed with full visual quality.

The present invention addresses this issue by providing an improved system and method for editing three dimensional objects using two dimensional images. More specifically, the present invention provides an image editing user interface system comprising a receiving process for receiving one or more rendered two dimensional images on a computer graphical user interface. Each of these two dimensional images represents reflected light from a lit three dimensional object model, and the reflective light at each point of the two dimensional image corresponds to an object point on the three dimensional object model.

The image editing user interface system also includes a changing process for changing a portion of the two dimensional image by changing the light intensity at a set of one or more points on the two dimensional image. In the preferred embodiment, this change in light intensity at the set of points causes a change in the shape of the three dimensional model to correspond to the change in the light intensity.

The references of record do not disclose or suggest changing the shape of the three dimensional model in the above-discussed way.

In particular, Rappaport, et al. discloses a Building Database Manipulator. In use, pre-existing data for a desired environment may be scanned in, traced or translated from another electronic format to provide a partial definition for the environment. The partial or empty environment is then refined using a specialized drawing program to enter entities and objects that fully define the environment in terms of floors, partitions, obstructions, and other data required for engineering planning. The input data are two dimensional representations of the environment, and when certain data are entered, the drawings may then be viewed in three-dimensions.

There is, thus, an important difference between the method and system described in Rappaport, et al. and the present invention – Rappaport, et al. is directed to a Building Design, while the present invention is directed to editing images of objects.

This general difference between Rappaport, et al. and the present invention is reflected in a number of more specific differences. For instance, Rappaport, et al. does not disclose or suggest a procedure in which a change in the light intensity at a set of one or more points is used to cause a corresponding change in the shape of a three-dimensional model.

Claims 11 and 17 are being amended to describe more expressly this feature of the invention. In particular, each of these claims is being amended to indicate that the change in light intensity at a set of one or more points on the two dimensional image causes a change in the shape of the three dimensional model to correspond to the change in the light intensity.

This feature of the invention is of utility because, as explained in the present application, it facilitates editing the shape of an object by, for example, smoothing the surface of the object or adding small features to the object.

It is noted that, in the Office Action, the Examiner cited column 8, lines 21-37 of Rappaport, et al, as disclosing that changing the light contrast of the 2D image results in changing the contrast in the 3D model. This change in the 3D model, however, is a change in the light contrast of that 3D model; not a change in the shape of that model.

The other references of record have been reviewed, and these other references, whether considered individually or in combination, also do not disclose or suggest this feature of the present invention.

In view of the above-discussed differences between Claims 1, 11 and 17 and the prior art, and because of the advantages associated with those differences, Claims 1, 11 and 17 patentably distinguish over the prior art and are allowable. Claims 3-11 are dependent from Claim 1 and are allowable therewith. Likewise, Claims 12-16 are dependent from Claim 11 and are allowable therewith; and Claims 17-20 are dependent from, and are allowable with, Claim 17. The Examiner is, accordingly, respectfully requested to reconsider and to withdraw the rejection of Claims 1, 3-11 and 17-19, and the objection to Claim 12, and to allow Claims 1 and 3-20.

In light of the foregoing discussion, the Examiner is asked to reconsider and to withdraw the objections to Claims 2 and 12 and the rejection of Claims 1, 3-11 and 13-19 under 35 U.S.C. 102, and to allow Claims 1-20.

If the Examiner believes that a telephone conference with Applicants' Attorneys would be advantageous to the disposition of this case, the Examiner is requested to telephone the undersigned.

Respectfully submitted,

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